

### **REMARKS**

The Applicants thank the Examiner for the thorough examination of the application. No new matter is believed to be added to the application by this Response.

### **Entry of Response**

Entry of this Response under 37 C.F.R. §1.116 is respectfully requested because it places the application in condition for allowance. Alternately, entry is requested as placing the application in better form for appeal.

### **Status of the Claims**

Claims 1-3 and 5-15 are pending in the application.

### **Rejection Under 35 U.S.C. §112 Second Paragraph**

Claims 1-3 and 5-15 are rejected under 35 U.S.C. §112, second paragraph as being indefinite. Applicants respectfully traverse.

At page 2 of the Office Action, the Examiner states:

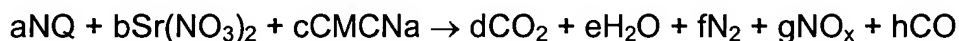
In claim 1, lines 2 and 3, the terms "gas generating composition" and "reducing material" render the claim indefinite because it is unclear whether the "gas generating composition" comprises a fuel and an oxidizing agent with the "reducing material" being a different, or second, fuel/catalyst or whether the "gas generating composition" is the oxidizing agent and the "reducing material" is the fuel.

However, although the gas generating composition and the reducing material may overlap each other in way of material (for example guanidine compounds or

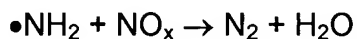
tetrazole compounds), it is clear that even the same material is divided into two portions: one portion being used as a component of the gas generating composition and the other portion being used as the reducing material.

The claimed invention therefore has two separate components, the gas generating composition and the reducing material (see claims 1 and 6). The reducing material is involved in a radical reaction, and the generated radical will reduce the amount of NO<sub>x</sub>. However, if a gas generating composition includes a reducing material incorporated therein, such a radical will not generate but will instead react with the other components.

Therefore, in the invention, the gas generating composition will proceed as:



In the invention, the reducing material will proceed as



where NQ is nitroguanidine, 5-AT is 5-aminotetrazole and a to h are mole numbers.

As a result, the differences between the "gas generating composition" and the "reducing material" are clear. The claims are thus clear, definite and have full

antecedent basis. This rejection is overcome and withdrawal thereof is respectfully requested.

**Rejection under 35 U.S.C. 103(a) over Lundstrom and Kirchoff**

Claims 1-3 and 5-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lundstrom (U.S. Patent No. 5,756,929) in view of Kirchoff (U.S. Patent No. 3,972,545). Applicants respectfully traverse.

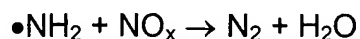
**The Present Invention and Its Advantages**

The present invention pertains to an airbag inflator that helps reduce the amount of NO<sub>x</sub> generated by the combustion of a gas generating agent. In one embodiment of the invention, a coolant/filter surrounds a perimeter of a gas generating composition. The present invention has many embodiments, and a typical embodiment is found in instant claim 1, which pertains to an inflator that has a novel combination of a gas generating composition, a reducing material, an ignition means and a coolant/filter surrounding a perimeter of the gas generating composition, wherein the reducing material is placed in the inflator.

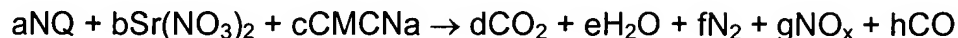
As discussed above, the reducing material produces a radical, •NH<sub>2</sub>, by combustion heat.



This radical then proceeds to extinguish NO<sub>x</sub>.



In comparison, the gas generating composition of the present invention proceeds as follows:



*Distinctions Of The Invention Over Lundstrom and Kirchoff*

Lundstrom pertains to non-azide gas generating compositions in which a gas generant composition can include guanidine compounds (column 2, lines 21-38). Lundstrom at column 3, lines 33-42 discusses ballistic modifiers. Lundstrom at column 4, lines 8-16 discusses ignition aids.

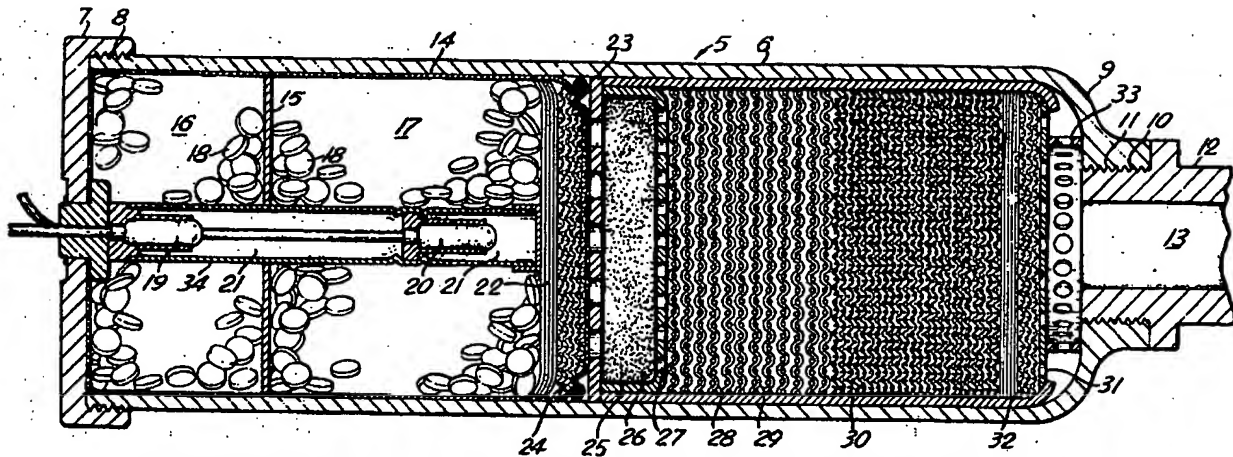
In Lundstrom, a gas generating composition includes a reducing material therein that proceeds as:



where i to p are mole numbers.

This chemistry of Lundstrom is fundamentally different from that of the present invention, as discussed above.

At page 3, lines 7-9 of the Office Action, the Examiner admits that Lundstrom fails to disclose an inflator with a coolant/filter. The Examiner then turns to Kirchoff. However, the Figure of Kirchoff discloses cooling screens 28 having a fundamentally different geometry than the peripheral coolant/filter 30 of the present invention.



That is, the coolant/filter surrounding a perimeter of the gas generating composition of claim 1 are features that are neither disclosed nor suggested in the drawing of Kirchoff. The present invention has a coolant/filter 30 surrounding the combustion chamber while the cooling screens 28 of Kirchoff are found only at one end of the slender combustion chamber. As a result, the combination of Kirchoff with Lundstrom fails to teach or suggest each and every element of claims 1 and 6 of the present invention.

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All the words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

Further, the applied art references teach away from the invention in at least two different ways.

First, Kirchoff uses an azide as a gas generating agent and, for this reason, uses  $\text{FeSO}_4$  (shown as 24 in the Figure of Kirchoff) to neutralize  $\text{Na}_2\text{O}$  generated by the combustion of the azide compound. In comparison, Lundstrom uses a non-azide gas generating agent having a very high combustion temperature. One of ordinary skill would recognize that  $\text{FeSO}_4$  (with a decomposition temperature of  $480^\circ\text{C}$ ) will decompose and eventually generate toxic  $\text{SO}_x$ .

Second, one having ordinary skill would recognize that a non-azide gas generating agent (or composition), as disclosed in Lundstrom, has a burning rate of 10-20 mm/sec or more at  $70\text{ kg/cm}^2$ , and Lundstrom thus requires a ballistic modifier such as a guanidine compound. In contrast, an azide gas generating agent, such as is disclosed in Kirchoff, has a burning rate of 40 mm/sec or more at  $70\text{ kg/cm}^2$ . The azide gas generating agent thus has a higher burning rate than the non-azide gas generating agent.

As a result, the two references of Lundstrom and Kirchoff clearly teach away from each other.

A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984). It is improper to combine references where the references teach away from their combination. *In re Grasselli*, 713 F.2d 731, 743, 218 USPQ 769, 779 (Fed. Cir. 1983). A *prima facie* case of obviousness may also be rebutted by showing that the art,

in any material respect, teaches away from the invention. *In re Geisler*, 116 F.3d 1465, 1471, 43 USPQ2d 1362, 1366 (Fed. Cir. 1997).

Therefore, one having ordinary skill in the art would not be motivated by the teachings of Lundstrom and Kirchoff to produce the present invention as embodied in independent claims 1 and 6. A *prima facie* case of obviousness has thus not been made. Claims depending upon claims 1 and 6 are patentable for at least the above reasons. This rejection is overcome and withdrawal thereof is respectfully requested.

#### **Information Disclosure Statement**

The Applicants thank the Examiner for considering the Information Disclosure Statement filed September 30, 2003 and for making initialed sheet 1 and sheet 2 of the PTO-1449 form of record in the application in the Office Action mailed August 19, 2004.

#### **Foreign Priority**

The Examiner has acknowledged foreign priority in the Office Action mailed August 19, 2004.

#### **The Drawings**

The Examiner is respectfully requested to indicate whether the drawing figures are acceptable in the next official action.

**Conclusion**

The Examiner's rejections has been successfully traversed, obviated or rendered moot. No issues remain. The Examiner is accordingly respectfully requested to place the application in condition for allowance and to issue a Notice of Allowability.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Robert E. Goozner, Ph.D. (Reg. No. 42,593) at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

In view of the above amendment, applicant believes the pending application is in condition for allowance.

Dated: June 2, 2006

Respectfully submitted,

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